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Case Report

Anaesthetic management of an esophageal stent perforation of the left main bronchus

Col Shivinder Singh^{a,*}, Air Cmde Ravindra Chaturvedi^b,
Col Ravindra Nath Shukla^c, Col Girish Saundattikar^c, S. Balaji^d

^a Associate Professor, Dept of Anaesthesiology & Critical Care, AFMC, Pune 4110040, India

^b Deputy Commandant, Command Hospital (AF), Bengaluru, India

^c Senior Adviser & HOD (Anaesthesiology) CH (SC), Pune 4110040, India

^d Resident, Anaesthesiology, AFMC, Pune 4110040, India

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A 36 yrs 55 kg male patient developed a stricture oesophagus (D6-GE junction) and pyloric stenosis following accidental consumption of a corrosive acid. After initial conservative management an oesophageal stent was placed. Thereafter he developed retrosternal burning chest pain and vomiting, a diagnosis of reflux oesophagitis was made and the stent was repositioned. Since the symptoms did not subside unsuccessful attempts to remove the stent were made.

After a fortnight, the patient developed orthopnoea and worsening cough with expectoration. Chest CT scan revealed the esophageal stent indenting the posterior wall of the left main bronchus with luminal narrowing, and multiple centrilobular opacities bilaterally. Fibre-optic bronchoscope (FOB) identified the stent with its wires visible, embedded in the posterior wall of the left main bronchus partially blocking it just below carina with the mucosa bulging over it (Fig. 1). A diagnosis of oesophageo bronchial fistula was made and a staged treatment was planned. Cervical oesophagostomy was performed first, followed in the second sitting by thoracotomy, removal of stent and repair of left main bronchus under general anaesthesia with one lung ventilation (OLV).

Examination of the patient revealed features of aspiration pneumonia left lower lobe. The patient had no other co-

Introduction

The self-expandable oesophageal prosthesis has helped in palliation of dysphagia in advanced esophageal cancer. However, the prevalence of complications and mortality are reported to be increased when there is inherent weakness of the tissues. This report describes the anaesthetic management in a patient presenting with an oesophageo bronchial fistula.

* Corresponding author. Tel.: +91 9823359039.

E-mail address: sshivinder@hotmail.com (S. Singh).

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Fig. 1 – Pre Op bronchoscopic view.

morbidities and was accepted for anaesthesia in ASA grade-3. A left sided chest tube was placed preoperatively under local anaesthesia to prevent catastrophic tension pneumothorax/mediastinum which was always possible in the setting of positive pressure ventilation and erosion of the left main bronchus. The patient was preoxygenated, premedicated with glycopyrrolate 0.2 mg IV and Fentanyl at 2 mcg/kg induced with Propofol and a rapid sequence intubation using suxamethonium was done. The affected bronchus and the left lung were isolated before IPPV was established with one lung ventilation. A right sided double lumen tube (DLT) was placed under bronchoscopic guidance. Anaesthesia was maintained using O₂ air and Sevoflurane at 3–4% concentration with the FiO₂ & PEEP being delivered to maintain oxygen saturation in excess of 92%.

A right thoracotomy was performed to approach the carina and the oesophagus. There was no option but to use a right side double lumen endo bronchial tube to allow isolation of the left main bronchus for its repair and also to prevent soiling of the right lung. A low tidal volume strategy using pressure

Fig. 2 – Removed stent.

controlled ventilation (PCV) was used once OLV was established. The patient remained stable throughout the surgery. The parameters were as per Table 1.

The stent was removed by gentle manipulation aided by bronchoscopic guidance (Fig. 2) and the left main bronchus repaired. The patient remained stable at the end of surgery and as IPPV would subject the bronchial repair to unnecessary stress hence he was extubated on table and shifted to intensive care unit for monitoring. Post-operative pain relief was provided by insertion of an 18-G epidural catheter in the paravertebral space at the D4-5 level. Continuous analgesia was achieved with an infusion of 0.125% bupivacaine at 5 ml per hour using an elastomeric mechanical pump. This was supplemented with injection Diclofenac Sodium and Fentanyl intermittently. A fibre-optic bronchoscopy done 3 weeks post-operatively showed a tag of soft tissue in the Lt main bronchus with a bluish suture visible inside (Fig. 3).

Discussion

The most common complication of OLV is hypoxia. The incidence of hypoxaemia has fallen from 20 to 25% in the 70s to less than 1% in the past decade.¹ Hypoxaemia during OLV could be detrimental to the safety of the patient and is a challenge for the anaesthesiologist.²

In this case isolation of the left lung was the only option since the left main bronchus was perforated left sided tube could not be placed.

Table 1 – Arterial blood gases, FiO₂ & PEEP settings.

Time	Preoperative	20 min after initiation of OLV	Intraop 30 min after manual collapse of the right upper lobe	15 min before extubation	30 min after extubation
PaO ₂ mmHg	63	64.4	90.6	163.5	88
PaCO ₂ mmHg	40	40	38.4	57.5	52.5
pH	7.5	7.5	7.45	7.35	7.36
HCO ₃	30.7	30.7	26.1	28.3	28.7
O ₂ Saturation %	84.8	94	97.2	98.9	96
FiO ₂	0.3	0.5	0.55	0.6	0.3
PEEP cm H ₂ O	Nil	6	8	8	Nil

Fig. 3 – Post Op bronchopic view.

Intentional collapse of the lung on the operative side by the surgeon facilitates most thoracic procedures. We were forced to adopt this approach and the right upper lobe was collapsed using gentle retraction to approach the oesophagus and Lt main bronchus. Despite this the patient remained stable and other than mild hypoxaemia and hypercarbia the procedure could be carried to conclusion without any complications.

Two strategies for ventilation are advocated to decrease the likelihood of hypoxaemia and, possibly, atelectasis, during OLV: a high tidal volume (V_t) (10–12 ml/kg) without PEEP³ or a moderate tidal volume (6–8 ml/kg) with PEEP.⁴ The concerns with a high tidal volume strategy include, over distension of alveoli leading to acute lung injury.^{5,6} It has also been observed that a high tidal volume (9 ml/kg) with no peep approach resulted in higher levels of cytokines as compared to a low tidal volume (5 ml/kg) with peep strategy.⁷ We therefore used a target V_t of 350 ml at 6.4 ml/kg rate adjusted to maintain EtCO_2 in a range to keep pH more than 7.30, target peak pressures less than 27 cm H_2O . PEEP was adjusted to achieve SpO_2 greater than 92% at all times. Pressure controlled ventilation (PCV) has been shown to provide better arterial oxygenation with the decelerating flow pattern as compared

with volume controlled ventilation.⁸ Our patient too did not have any episode of hypoxaemia intra operatively.

The use of volatile anaesthetics in this situation has been questioned however, Sevoflurane has now been found to be as good as Propofol in its effect on the shunt fraction and arterial oxygen tension for similar bispectral index values.⁹ We used Sevoflurane without any detrimental effects.

To conclude, the highlights of the anaesthetic management were preoperatively, pre-emptive placement of a left sided chest tube, initiation of positive pressure ventilation only after isolation of the right lung, the use of moderate tidal volume ventilation with PEEP using the PCV mode of ventilation and finally good post-operative pain relief.

Conflicts of interest

All authors have none to declare.

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